

*JELLISONIA PAINTERI* (SIPHONAPTERA: CERATOPHYLLIDAE),  
A NEW SPECIES OF FLEA FROM GUATEMALA

MICHAEL W. HASTRITER<sup>1</sup>

Research Associate, Section of Invertebrate Zoology

RALPH P. ECKERLIN<sup>2</sup>

Research Associate, Section of Invertebrate Zoology

ABSTRACT

A new montane species of flea, *Jellisonia painteri* (Ceratophyllidae: Ceratophyllinae), is described from the cloud forests of the Sierra de las Minas (2200 m), Departamento de Zacapa, Guatemala. This is the first published record of *Jellisonia* in Guatemala. Specimens were collected from *Habromys lophurus* (Osgood, 1904), *Peromyscus grandis* Goodwin, 1932 and *Reithrodontomys microdon* Merriam, 1901. The preferred host of this new species appears to be *H. lophurus*. *Jellisonia ironsi* (Eads, 1947) and *Jellisonia wisemani* Eads, 1951 are also reported for the first time from Guatemala.

KEY WORDS: *Jellisonia painteri*, flea, Siphonaptera, Guatemala

INTRODUCTION

The montane regions of Guatemala are poorly known biologically and the fleas from that region are no exception. A network of scientists from Central America and the United States initiated an expedition in 1998 to study cloud forest mammals and their parasites in the Sierra de las Minas, Guatemala. Among this material was a new species of flea belonging to the genus *Jellisonia* Traub, 1944. This is the first report of the genus *Jellisonia* in Guatemala. In general, the genus *Jellisonia* occurs from north central Texas, U.S.A. to southern Panama, although few records have been published from south of Chiapas, Mexico. Smit (1958) reported one female of *Jellisonia ironsi* (Eads, 1947) from "road from San Salvador to Santa Ana, at km 35", El Salvador from *Baiomys musculus griseus* = *Baiomys musculus* (Merriam, 1892); Tipton and Mendez (1961) described *Jellisonia johnsonae* from Cerro Punta, Panama on *Scotinomys teguina episcopi* = *Scotinomys teguina* (Alston, 1877), and Tipton and Mendez (1966) reported additional specimens of *J. johnsonae* from near the type locality. The latter authors also reported a female specimen as a probable undescribed species in Los Santos Province, Panama. The senior author is currently revising the genus *Jellisonia* and has examined most of the known specimens represented in this genus. Among material from the Robert Traub collection (Carnegie Museum of Natural History, Pittsburgh, PA) additional unreported records of *J. ironsi* occurring in Costa Rica have been examined. A detailed description of these specimens will be given elsewhere.

<sup>1</sup> Monte L. Bean Life Science Museum, Brigham Young University, 290 MLBM, P.O. Box 20200, Provo, Utah 84802-0200, e-mail: mwhastriter@sprintmail.com.

<sup>2</sup> Natural Sciences Division, Northern Virginia Community College, 8333 Little River Turnpike, Annandale, Virginia 22003, e-mail: recklerlin@nvcc.edu.

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The purpose of this paper is to describe a new species of *Jellisonia* from Guatemala and to report additional species of the genus that occur in Guatemala that have not been reported previously.

#### MATERIALS AND METHODS

A study site was established in the cloud forest (2,200 m elevation) located along the Rio Hondo, in the Reserva de Biosfera, 6 km NNW of San Lorenzo (15°08'26"N, 89°40'36"W), Departamento de Zacapa, Sierra de las Minas, Guatemala. Three trap lines were set each night from 8–17 April 1998 using Sherman live traps, museum specials, and rat traps to capture small mammals. Traps were baited with a mixture of peanut butter, rolled oats, bacon and raisins. Mammals were individually placed in separate plastic bags at the capture site, euthanized, and brought to the processing area. Animals were brushed with a stiff bristle brush over a white enamel pan to obtain fleas. Fleas were preserved in 70 per cent ethanol and later treated with 10 per cent potassium hydroxide, dehydrated in a series of ethanol washes, further cleared in xylene, and mounted on slides in Canada balsam. A second site was established at La Cabana (15°04'54"N, 89°55'59"W), Departamento de El Progreso in the Reserva de Biosfera, and the same trapping and flea collection techniques were employed from 2–12 May 1998 as were reported April 8–17. Several specimens are also included that were collected in July 1996 from the San Lorenzo site.

Anatomical terminology used herein follows that of Rothschild and Traub (1971); however, reference is made to two "inverse setae" on the anterior apical margin of the distal lobe of st.(sternite) IX that are not described in their glossary of terminology (Fig. 1D). These are herein defined for future reference. These two setae are close together, one dorsal and the other ventral. The ventral seta is always the larger of the two. The small dorsal seta is present in all species of *Jellisonia*, although it has been omitted in the literature in most illustrations of the ninth sternum. A few species of *Kohlsia* possess this character, but it is otherwise restricted to the genus *Jellisonia*.

An Olympus BX61Compound Microscope, Olympus CV12 digital camera, Olympus Microsuite™ B3SV program, and Adobe Photo Shop 7.0 were used to prepare digitized images.

The overall body dimensions of males and females were measured from the foremost portion of the frons to the posterior margin of the telomere in males and to the posterior border of the sensillial plate in females.

#### RESULTS AND DISCUSSION

##### *Jellisonia painteri* Hastriter and Eckerlin, new species

*Type Material*.—GUATEMALA. **Zacapa Department**: Rio Hondo, Sierra de las Minas, 6 km NNW San Lorenzo (15°08'26"N, 89°40'36"W), 2200 m, ex *Habromys lophurus* (Osgood, 1904) [Host animal voucher specimen (MANCA-524) in collection of Universidad de San Carlos de Guatemala and host tissue voucher specimen (SP 13349) in Carnegie Museum of Natural History, Pittsburgh, PA], 12 April 1998, R. P. Eckerlin, male holotype and 4♀ paratypes; following types with same data as holotype except 13–17 April 1998, 5♂, 7♀ paratypes; Rio Hondo, Sierra de las Minas, 6 km NNW San Lorenzo (15°08'26"N, 89°40'36"W), 2200 m, ex *Peromyscus grandis* Goodwin, 1932, 10 April 1998, R. P. Eckerlin, allotype; following types with same data as allotype except 9–13 April 1998, 5♂ paratypes; following types with same data as allotype except ex *H. lophurus*, 1 and 4 July 1996, S.G. Perez, 1♂, 1♀ paratypes; and following with same data as allotype except ex *Reithrodontomys microdon* Mirriam, 1901, 4 July 1996, S. G. Perez, 1♂, 1♀ paratypes. Holotype (USNM Type No. 105757), allotype and 6 paratypes (3♂, 3♀) deposited in the National Museum of Natural History, Washington, D.C.; 6 paratypes (3♂, 3♀) in the Carnegie Museum of Natural History, 4 paratypes (2♂, 2♀) in the Michael W. Hastriter collection, and the remaining paratypes (4♂, 5♀) in the Ralph P. Eckerlin collection.

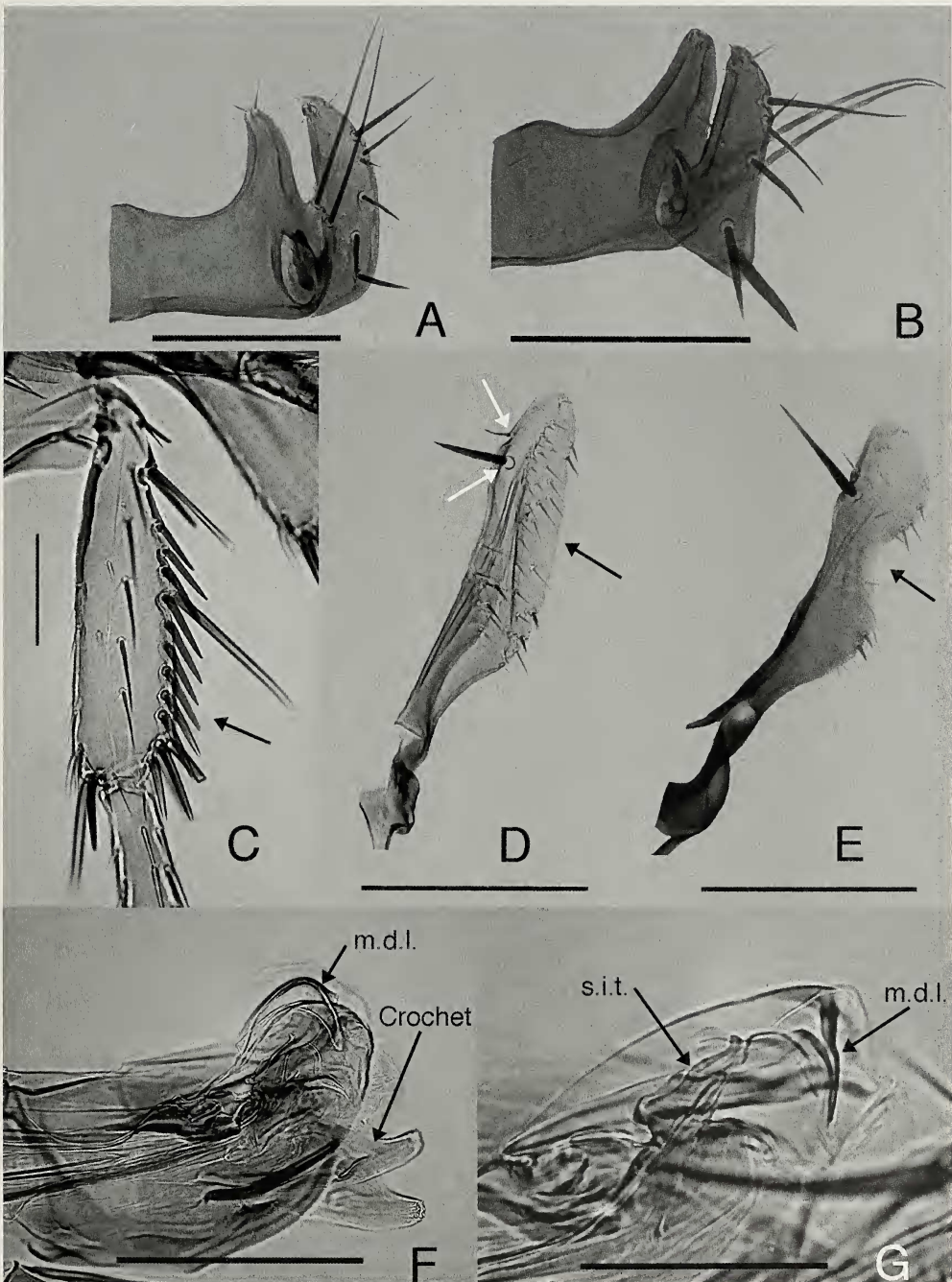


Fig. 1.—A. *Jellisonia painteri* n. sp. Basimere and telomere (paratype). B. *J. guerrerensis*. Basimere and telomere. C–D. *J. painteri* (paratype). C. Hind tibia of female (arrow to comb). D. Distal arm of ninth sternum (black arrow: entire margin; white arrows: ventral and dorsal inverse setae). E. *J. klotsi*, ninth sternum (arrow depicts sinus). F. *J. painteri*, apex of aedeagus (m.d.l. = median dorsal lobe) (paratype). G. *J. guerrerensis*, apex of aedeagus (s.i.t. = sclerotized inner tube). Scale = 100 $\mu$ .



*Diagnosis.*—Among those species of *Jellisonia* that have distinctive combs along the dorsal margin of the mid and hind tibiae (Fig. 1C), *J. painteri* is most closely related to *J. klotsi* Traub, 1944 and *J. guerrerensis* Morales, 1990. The new species is distinguished in the male by the smoothly rounded apex of the median dorsal lobe (m.d.l.) (Fig. 1F) and the slightly convex caudal margin of the distal arm of st. IX (Fig. 1D). In *J. klotsi* and *J. guerrerensis*, the apex of the m.d.l. is acutely pointed (Fig. 1G) and the caudal margin of st. IX has two lobes separated by a shallow sinus (Fig. 1E). They also differ in details of the crochet, shape of the telomere, and other features of the aedeagus. Females may be separated from all other species that have combs on the meso- and metatibiae, except *J. klotsi*, *J. guerrerensis*, and *J. hayesi hayesi*, by the presence of a large dorsal lobe subtended by a distinct sinus on the caudal margin of st. VII (Fig. 2D). The number of setae occurring on each side of st. IV–VI varies in the new species with two or three. Some specimens possess two setae per side on st. IV–VI, while others bear three per side. Those with two must be separated from *J. klotsi* and *J. guerrerensis*, which consistently possess two per side. In these cases, they may be separated by locality since *J. klotsi* and *J. guerrerensis* are not known to occur in Guatemala. For those specimens with three setae per side on st. IV–VI, they are similar to *J. h. hayesi* but differ by the sclerotized portion of the bursa copulatrix. The perula is reflected rearwards in *J. painteri* (Fig. 2D), while this structure is straight in *J. h. hayesi*. In addition, *J. h. hayesi* is not known to occur in Guatemala.

*Description.*—Head (Fig. 2A–B): Frons evenly rounded with slight indication of frontal tubercle in both male and female. Ventral ocelli close to oral angle. Preantennal setae composed of three major rows, anterior row of 6 setae separating punctate anterior area of frons from smooth lateral surface of ocular area; second row of 4 setae, and ocular row of 3 setae. Single small seta at oral angle. Postantennal region with three rows of setae (3, 6, and 6 in male; 3, 5, and 7 in female); posterior row of each with intercalary setae. Antennal falx dividing head in male but not reaching dorsum in female. Sparse row of minute setae along dorsal margin of antennal fossa; female with heavily sclerotized rim along dorsal margin, several setae anterior to rim. Indication of shallow occipital sulcus in male. Setae along apex of scape and pedicel at most reaching next segment. Male antennae extending onto prosternum, female antenna much shorter. Eye pigmented and entire. Trabecula centralis present. Four segments of maxillary palpus each subequal in length. Maxilla tapering to narrowly extended point. Labial palpus of 5 segments, apical segment nearly twice length of other segments; apex not extending to apex of procoxa.

Thorax (Fig. 2C): Pronotum with single row of setae with intercalaries. Pronotal comb of 18–20 spines ( $n=8$ ) in male and 20–22 ( $n=8$ ) in female. Mesonotum and metanotum each with 2 rows of setae, metanotum with scattered setae anterior to rows. Intercalary setae present in main rows of each. Mesonotum with 3–4 pseudosetae under collar. Nine setae on metapleuron (mesipsternum and mesepimeron). Lateral metanotal area with 2 setae; pleural arch well developed. Metepisternum with single large seta; squamulum present. Metepimeron with three vertical rows of setae, usually 3, 3, 1 but number variable; all setae below level of spiracle.

Legs (Fig. 1C): Procoxa broad, width nearly half the length of segment, with many lateral setae. Mesocoxa with sparse setae along ventral half of anterior margin; setae extended along entire anterior margin of metacoxa. Lateral oblique break line of mesocoxa extending across half of coxa. Profemur with 7–8 lateral setae and a single seta on mesal surface. Tibiae of each leg with single lateral vertical row of setae and large supernumerary setae along dorsal margin forming a comb, particularly below the fifth dorsal notch of meso- and metatibiae. Metatibia with single vertical row of minute setae on mesal surface. Protarsus I with comb of 3 setae on posterior margin. Distitarsomere of each leg with 5 lateral plantar bristles, the first pair shifted onto plantar surface. Two stout preapical plantar bristles on protarsus V, each hair-like on meso and metatarsus V.

Unmodified Abdominal Segments: Two rows of setae on each tergite; anterior row with diminishing numbers of setae from anterior to posterior. Main row with intercalary setae. One seta below level of spiracles. Usually t. (tergite) I–III with marginal spinelets (1, 2, 1 per side), respectively. Occasional specimen with spinelet on t. IV. Anterior ventral margin of t. II with distinct sclerotization, greater in female than male. Male and female each with 3 antensensillar bristles. Those of male borne on projection, middle bristle large, dorsal and ventral bristles very small. Middle bristle of female longest, dorsal and ventral bristles about 1/3 and 4/5 length of middle bristle, respectively. Spiracles round posteriorly. Sternites II–VII of male each with 2 setae per side; number in female variable with 2 or 3 setae per side on st. II–VI.

Modified Abdominal Segments, male (Fig. 1A, 1D): Tergum VIII large, expanded over t. IX; adorned with group of 5–6 dorsal setae and 1–2 ventral setae. Spiracle VIII notably displaced caudally at posterior margin of sensillar plate. Process 1 of t. IX finger-like with 3 small apical setae; below 3 setae is a small circular clearing

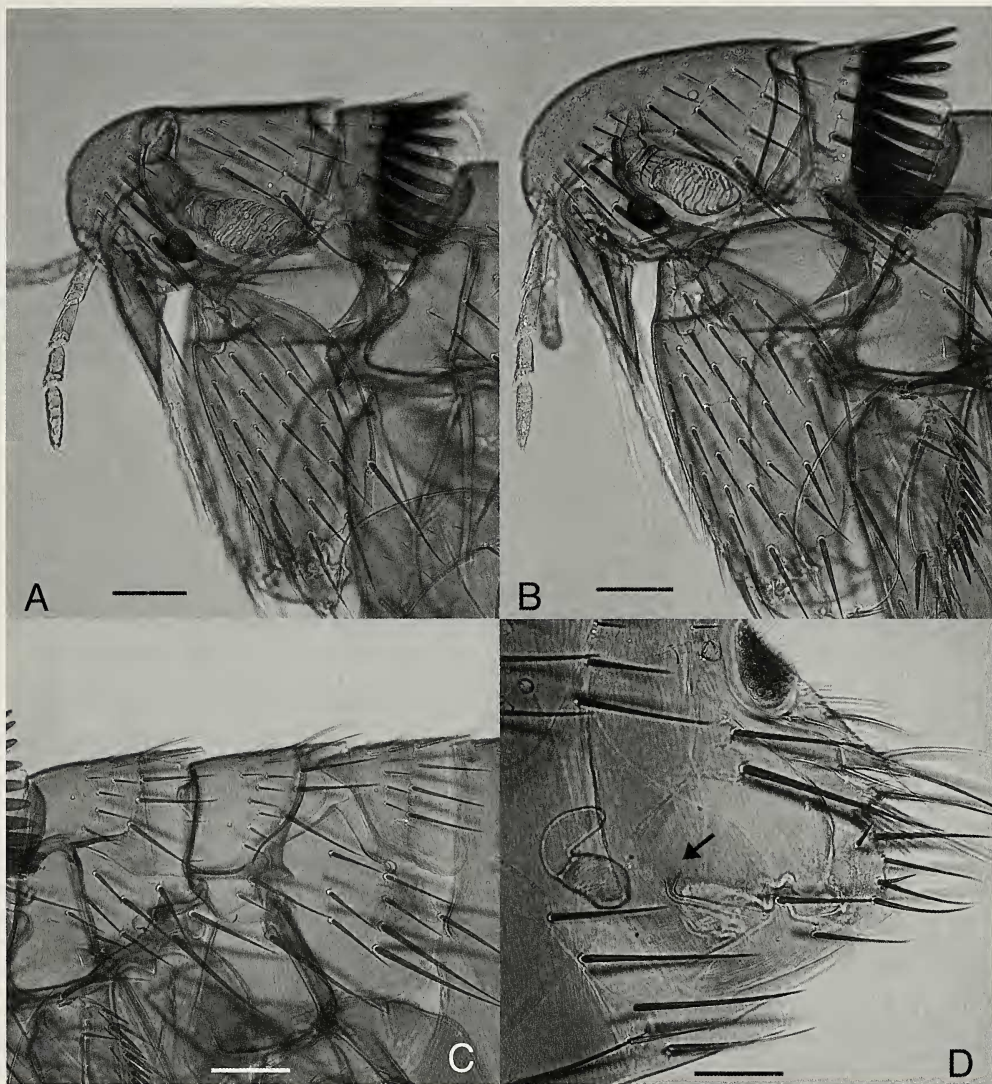


Fig. 2.—A–D. *Jellisonia painteri* n. sp. A. Head and pronotum, male (paratype). B. Head and pronotum, female (allotype). C. Thorax, female (allotype). D. Female terminalia, seventh sternum, spermatheca, and bursa copulatrix (arrow: reflexed bursa copulatrix). Scale = 100 $\mu$ .

(7–8  $\mu$ ) resembling the fovea on the basimere of *Megarthrogllossus* Jordan and Rothschild, 1915. Two acetabular bristles borne on slight projection separated by a space three times their basal width. Telomere with parallel sides, bluntly rounded at apex, with 5 stout setae along caudal margin; 2 dorsal setae smaller and directed caudad, 3 ventral setae spiniform, placed on mesal surface and directed ventrad with long axis of telomere. Lateral patch of 8–10 minute setae on proximal half of telomere. Sternum VIII reduced, pencil-like with apical long bifurcate membranous lobes. Convoluted membrane between st. VIII and st. IX with medial pair of spiculated bulbous structures. Sternum IX fused at base, with membranous point of flexure approximately  $1/5^{\text{th}}$  from base of distal arm. Distal arm setiferous along posterior half, with two small spiniform setae near ventral caudal margin. Ventral inverse seta long, slender, set back from margin; dorsal inverse seta marginal and much smaller. Mesal groove traversing length of distal arm. Tendon of st. IX extending well beyond aedeagal apodeme. Apex of proximal arm of st. IX fused with manubrium of t. IX and proximal spur of aedeagus.



Aedeagus (Fig. 1F): Sides of aedeagal apodeme nearly parallel. Proximal spur present. Accessory lateral lobes present. Membranous disto-lateral lobe extends beyond median dorsal lobe. Apical sclerite of median dorsal lobe thickened and rounded at apex. Lateral lobe semi-sclerotized, extending upward and over disto-lateral lobe and median dorsal lobe. Crescent sclerite short, satellite sclerite present. Sclerotized inner tube broad proximally, tapering to apex; with short arching fistula. Dorsal armature very long (twice length of sclerotized inner tube). Crochet with heavily sclerotized basal margin; paxillus present, tuberculate at apex. Penis rods extend well beyond apex of aedeagal apodeme, without coil.

Modified Abdominal Segments, female (Fig. 2D): Patch of 4–6 small setae on t. IX postad to antesensilial bristles. Tergum IX large with dorsal group of 2–4 setae, ventral group of 1–2 setae, apical marginal group of 3–4 setae, and 2 short subspiniform setae in an oblique row from margin toward sensillum. Large dorsal and ventral lobes on caudal margin of st. VII forming a deep sinus; lateral row of 4–5 setae. Anal stylet four times as long as wide; long apical seta, shorter ventral seta, and minute dorsal seta close to apex. Ventral anal lobe angulate on ventrocaudal margin; bearing 4 long stout setae, dorsal most seta separated from ventral three setae by space wider than width of base of setae. Sternum VIII broad, with small lobe at apex; coarse rugulose pattern running with long axis of sclerite. Bursa copulatrix subequal in length to spermatheca; perula reflected caudad. Hilla and bulga of spermatheca subequal in length.

*Dimensions (slide mounted specimens).*—Average length of males, 2.3 mm, range: 2.2–2.4 mm (n = 12); Average length of females, 2.7 mm, range: 2.4–3.1 mm (n = 15).

*Etymology.*—This species is named in honor of the late Harry F. Painter, distinguished citizen, American veteran war hero, entomologist, and friend.

*Remarks.*—A comparison of the hosts collected at the San Lorenzo and La Cabana sites is noteworthy. While the number and composition of the small mammals collected at each site were similar, neither the new species nor other species of *Jellisonia* were collected from hosts at the La Cabana site. The San Lorenzo site yielded a total of 118 small mammals [*P. grandis* (n = 96) and *H. lophurus* (n = 22)] and the La Cabana site 128 mammals [*P. grandis* (n = 115) and *H. lophurus* (n = 13)]. Six of 96 *P. grandis* (6.3 %) and 11 of 22 *H. lophurus* (50%) were infested with one or more *J. painteri* at the San Lorenzo site. The average number of fleas (flea index) per positive infested *P. grandis* and *H. lophurus* was 1.0 and 1.54, respectively. Why specimens of *Jellisonia* were not obtained from the same host animals examined at the La Cabana site is not known. Weather was similar, trapping/collecting techniques were conducted in the same manner, and the work was carried out less than four weeks after the San Lorenzo collections.

#### *Jellisonia wisemani* Eads, 1951

*Material Examined.*—GUATEMALA. **Chiquimula Department:** 2.4 km NW Esquipulas, 945 m, (14°34'N, 89°21'W), ex *Peromyscus* sp., 6 March 1952, L. de la Torre, 1♀, 12 March 1952, 2♂, 1♀; 4 km ENE and 4.8 km SE Esquipulas, ex *Oryzomys* sp., 13 March 1952, L. de la Torre, 1♂; and 4 km ENE Esquipulas, 915 m, 12 March 1952, L. de la Torre, 2♂, 1♀ [Robert Traub collection, Carnegie Museum of Natural History (CMNH)].

*Remarks.*—*Jellisonia wisemani* is reported for the first time in Guatemala and represents an extreme southern record for this species. The nearest and unreported specimens examined (included in revision) is 325 km to the west in Chiapas, Mexico near the border of Mexico and Guatemala.

#### *Jellisonia ironsi* (Eads, 1947)

*Material Examined.*—GUATEMALA. **Jutiapa Department:** 1.6 km SE Jutiapa, 900 m (14°17'N, 89°54'W), ex *Baiomys* sp., 25 March 1952, L. de la Torre, 1♀ (CMNH).

*Remarks.*—This is a new record in Guatemala and the most southerly record for the species. Other specimens of *J. ironsi* hereunto reported in the literature were examined from Costa Rica but will be discussed in the revision of the genus *Jellisonia*. This species is relatively specific to both species of *Baiomys* and, insofar as now known, follows the distribution of these hosts rather closely.

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